# Utilization of Nano Carriers in the Field of Nanotechnology

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## Commentary

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## ABOUT THE STUDY

A nanomaterial employed as a transport component for another chemical, such as a drug, is called a nanocarrier. Micelles, polymers, carbon-based materials, liposomes, and other substances are frequently utilised as nanocarriers. Nanocarriers' distinctive properties suggest a potential utility in chemotherapy, and they are now being investigated for their use in medication delivery.

Since microcapillaries have a diameter of 200 nm and a diameter range of 1-1000 nm for nanocarriers, nanomedicine frequently refers to objects with a diameter of less than 200 nm. Nanocarriers can deliver medications to parts of the body that would not typically be accessible due to their small size. Because nanocarriers are so tiny, it is frequently challenging to administer substantial pharmacological doses using in nanocarriers. The low drug loading and drug encapsulation that frequently results from the emulsion procedures used to create nanocarrier presents a challenge for therapeutic application.

Polymer conjugates, polymeric nanoparticles, lipid-based carriers, dendrimers, carbon nanotubes, and gold nanoparticles are few of the newly identified nanocarriers. Liposomes and micelles are two types of lipid-based carriers. Gold nanoshells and nanocages are two types of gold nanoparticles. Hydrophobic and hydrophilic medications can be distributed throughout the body because to the utilization of several types of nanomaterial in nanocarriers. Since the human body is mainly made of water, one of the main therapeutic advantages of nanocarriers is their capacity to transport hydrophobic medications to patients in an efficient manner. Depending on the orientation of the phospholipid molecules, micelles can contain either hydrophilic or hydrophobic medicines.

Some nanocarriers have arrays of nanotubes that enable them to hold both hydrophobic and hydrophilic medications.

Unwanted toxicity from the sort of nanomaterial being utilized can be a problem with nanocarriers. If inorganic nanomaterial builds up in specific cell organelles, it can also be toxic to humans. To create safer, more efficient nanocarriers, new research is being done. Since protein-based nanocarriers are found in nature and often exhibit lower cytotoxicity than synthetic compounds for usage as therapeutic agents with high potential.

Because they can deliver pharmaceuticals to site-specific targets, nanocarriers are helpful in the drug delivery process because they allow drugs to be administered in some organs or cells but not in others. Site-specificity is a significant therapeutic advantage since it stops medications from being administered to the incorrect locations. Nanocarriers are used in chemotherapy because they can lessen the chemotherapy's harmful, widespread toxicity on the body's healthy, rapidly dividing cells. Chemotherapy medications must be given to the tumour without spilling over into healthy tissue because they can be highly damaging to human cells. Nanocarriers can transport pharmaceuticals using four different strategies: Passive targeting, active targeting, pH specificity, and temperature specificity.

Passive targeting refers to a nanocarrier's ability to enter a tumour's bloodstream. The improved permeability and retention effect, which is related to the Poly Ethylene Oxide (PEO) coating on the outside of many nanocarriers, is what leads to this accumulation. PEO enables nanocarriers to pass through a tumor's leaky vasculature, where they become trapped and are unable to flee. The network of blood vessels that grow in a tumour and have a lot of tiny pores is called the leaky vasculature of a tumour. These pores let in nanocarriers, but they also have several bends that let the nanocarriers get caught. The amount of medicine accumulated at the tumour location increases as more nanocarriers are trapped.